

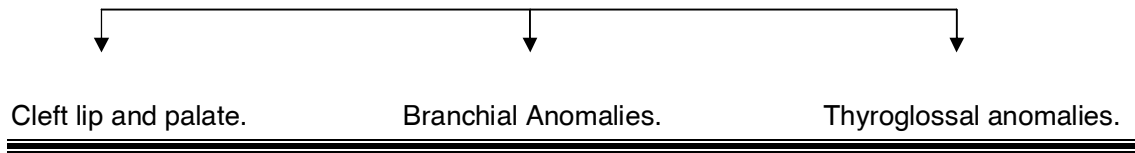
Lecture Notes

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Congenital anomalies of the face and neck

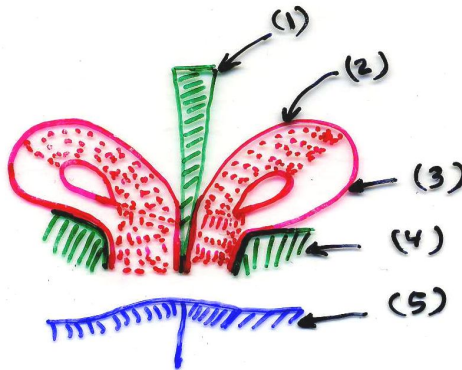


((Cleft Lip and Palate))

Embryogenesis:

At about the end of the 4th week of intrauterine foetal life, a number of processes appear in the face which are:

- (1). the frontal process.
- (2). the medial nasal process.
- (3). the lateral nasal process
- (4). the maxillary process
- (5). the mandibular process.



Formation of the upper lip:

The medial nasal processes of both sides together with the frontal process, give rise to the middle portion of the nose, middle portion of the upper lip, anterior portion of the maxilla, and primary palate. Fusion between the maxillary processes on both sides and the medial nasal processes leads to complete formation of the upper lip.

Formation of the palate:

1- Primary palate (anterior to incisive foramen): Formed due to fusion of the frontonasal and the medial nasal process.

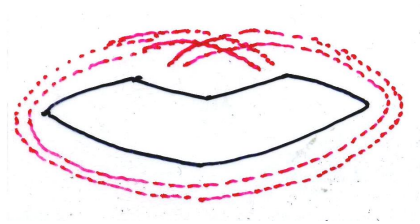
2- Secondary palate (posterior to incisive foramen): Formed between 7 and 8 weeks of development due to fusion of the palatine shelves of the maxillary processes.

Anatomical Consideration:

A-The Lip

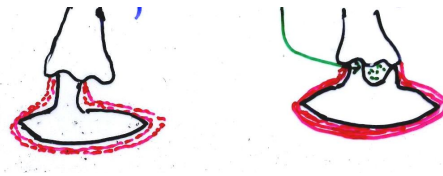
Normal Anatomy

The orbicularis oris muscle forms a complete circle and is attached with each other in the central part of the upper lip
#figure#



Abnormal Anatomy:

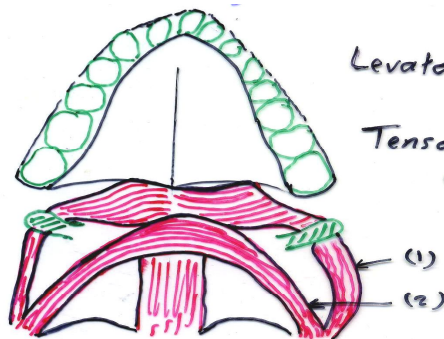
- ❖ The circle is incomplete and the muscle fibers insert in the base of the ala of the nose in the cleft side.
- ❖ In bilateral cleft lip, the central part of the lip is devoid of muscle.



B- The Palate

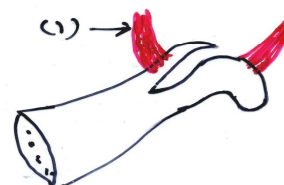
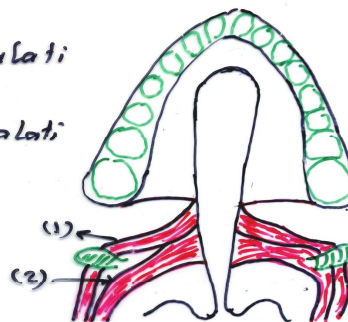
Normal Anatomy

- ❖ The levator palati and the tensor palati muscles take their origin from the skull base and insert in the midpalatal aponeurosis in the midline.
- ❖ They act as sling to pull the soft palate upward and backwards against the posterior pharyngeal wall
→ velopharyngeal competence.



Abnormal Anatomy

The muscles are oriented more longitudinally and insert in the posterior edge of the palatal bone and along the bony cleft margin.



Etiology:

- ❖ Maternal radiation
- ❖ Maternal infections:
 - Rubella
 - Toxoplasma
- ❖ Drugs during pregnancy:
 - Anticonvulsant.
 - Steroids
 - Aspirin
 - Tranquilizers

Classification:

A- Cleft Lip: classified according to site and affection of the floor of the nose:

- Unilateral "left sided or right sided but commonly left sided"
- Bilateral.
- Midline cleft.
- Complete "The cleft reaches to the floor of the nose"
- Incomplete "simple" → The cleft does not reach to the floor of the nose.

B- Cleft Palate.

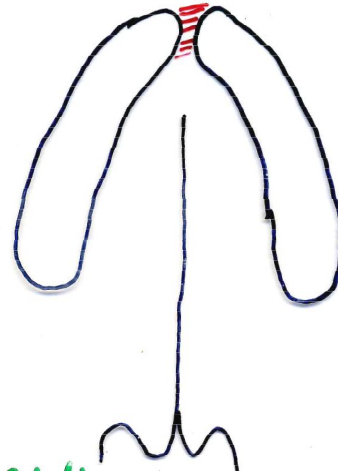
- Unilateral.
- Bilateral.
- Cleft of 1ry palate "anterior to incisive foramen"
- Cleft of 2ry palate "posterior to incisive foramen"

C-Cleft Lip and Palate.

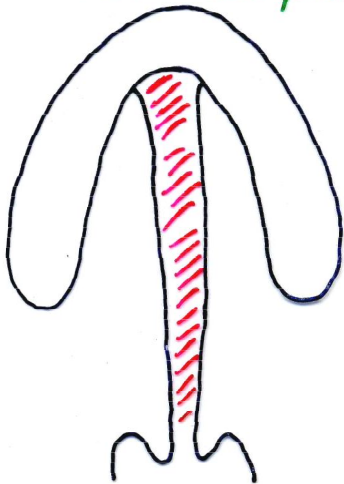
- Complete cleft lip and palate "both are continuous with each other". It may be unilateral or bilateral.
- Incomplete "both are NOT continuous with each other".



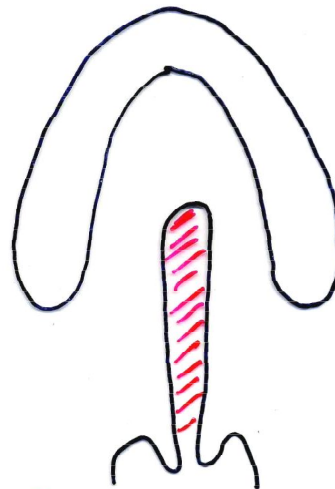
Normal palate



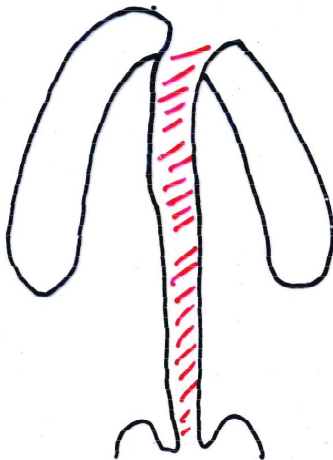
Cleft 1ry palate



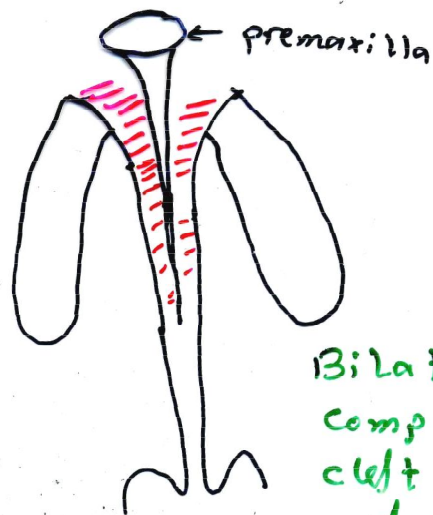
Complete cleft 2ry palate



Incomplete cleft 2ry palate



Unilateral complete cleft lip and palate



Bilateral complete cleft lip and palate

Physiological Aspects:

A- Feeding:

For normal feeding to occur, there must be a negative intraoral pressure to help the newborn to do normal sucking. The normal muscles insertion is responsible for this.

B- Speech

Good closure of the velopharyngeal sphincter is responsible for efficient vocal cord action.
Velopharyngeal competence → No nasal escape of voice & negative pressure in the pharynx
→ firm closure of the vocal cords → clear strong vocal note.

Problems associated with cleft patients:

1- Feeding problems:

Abnormal muscle insertion → no negative intraoral pressure → no proper sucking. The child works to the point of exhaustion. Sleep is due to fatigue and not due to full stomach. He wakes up few hours later still hungry.

Solution:

- Passive delivery of the milk into the mouth.
- Large cross cuts in a soft nipple.
- Cleft palate nipple with a rubber flange to obturate the defect.

2- Speech problems:

VPI "**Velopharyngeal incompetence**" → improper function of vocal cords due to escape of the air through the nose → hypernasal speech.

Solution:

- Speech aid prosthesis to obturate the defect.
- Surgical correction.
- Speech therapy "speech therapist".

3- Weight Loss:

Occurs due to improper feeding.

4- Chest infection

Occurs due to frequent aspiration of milk into the respiratory passages.

5- Middle ear problems

Occurs due to escape of milk to the eustachian tube → closure of the tube → otitis media, which is frequently associated with the cleft patients.

Solution:

- Drainage of the middle ear by **Gromet's tube**.

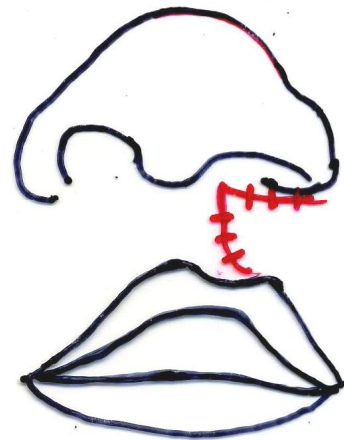
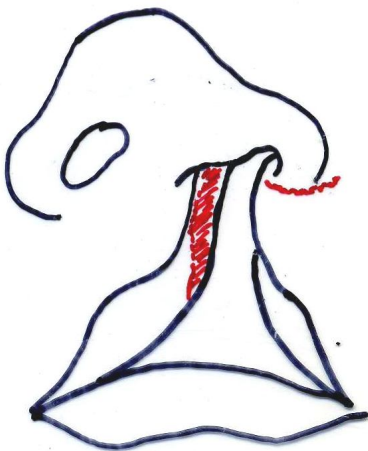
6- Malocclusion

Due to impaired growth of the maxilla.

Treatment:

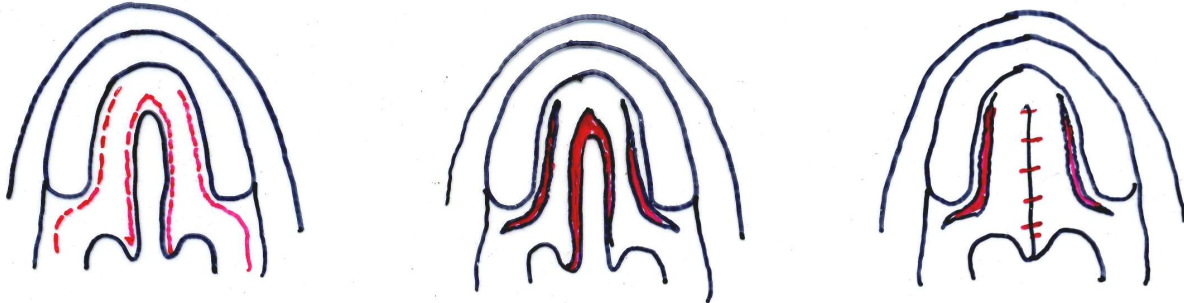
A- Cleft Lip:

- The cleft lip is repaired at first.
- The patient should fulfil the "**Rule of Ten**":
 - not less than 10 weeks age.
 - not less than 10 pounds weight.
 - Haemoglobin not less than 10 grams.
- Rotational advancement flap is done "**Millard Repair**"



B- Cleft Palate.

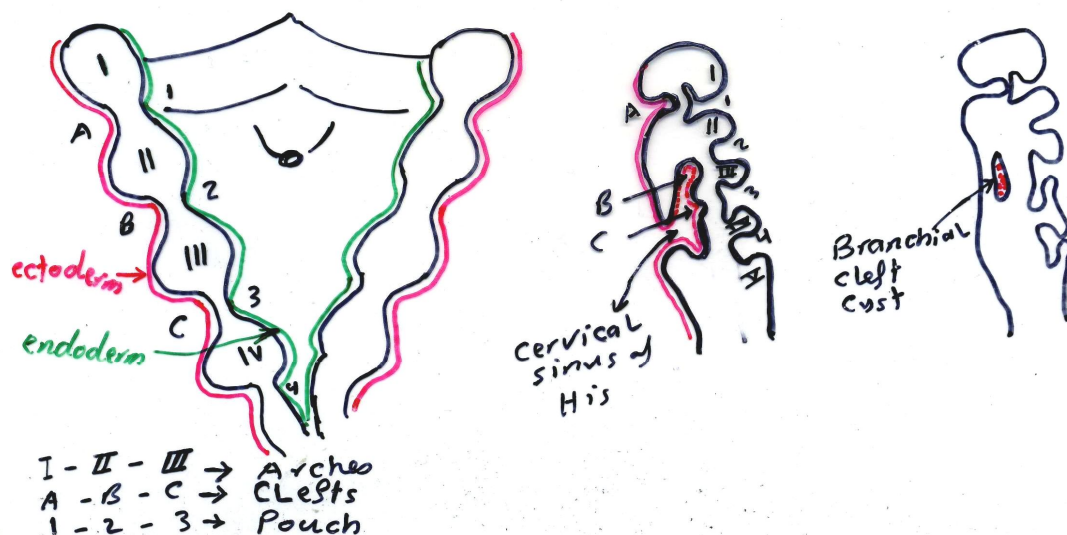
- Repair is done at the end of the **1st year**.
- **Von-Langenbeck repair**. It is an anatomical repair in the midline after making lateral release incisions and cutting tensor palati tendon.



((Branchial Anomalies))

Embryogenesis:

- ❖ The branchial apparatus consists of six mesodermal arches (**branchial arches**) that are separated from each other externally by ectoderminally lined branchial grooves (**branchial clefts**) and internally by endoderminally lined **pharyngeal pouches**.
- ❖ By the end of the 4th week of gestation, four well defined pairs of branchial arches are visible externally; the 5th and 6th arches are small and cannot be seen.
- ❖ Shortly thereafter, the 2nd arch increases in thickness and proliferates caudally to meet the enlarging 5th arch. As a result, the 2nd, 3rd, and 4th branchial clefts become enclosed in an ectoderminally lined cavity called "**The cervical sinus of His**".
- ❖ Eventually, this sinus becomes obliterated by fusion of its walls → smooth uniform contour of the neck.



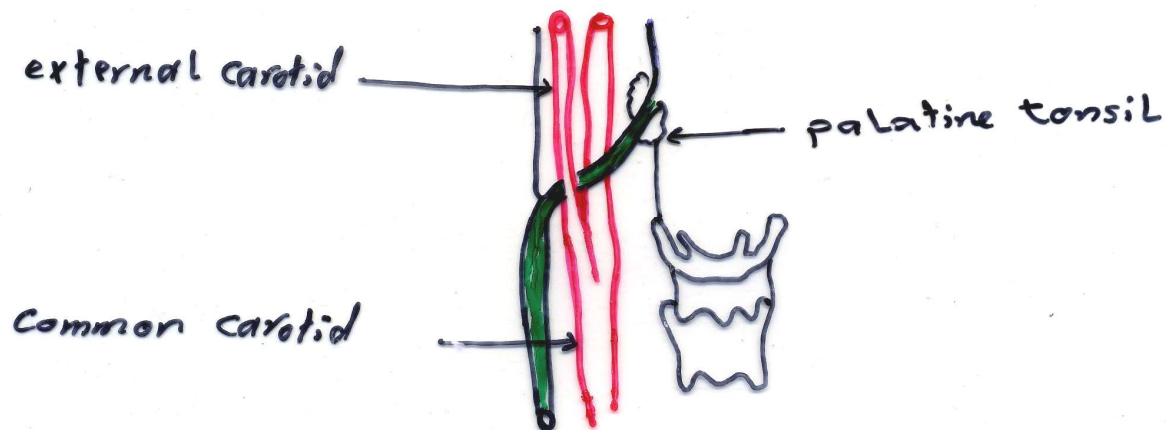
A-Branchial Fistula

Causes: Occurs due to persistence of the cervical sinus of His

- ❖ **Usually congenital** - appear at birth.
- ❖ **Rarely acquired** - appears later after rupture of an infected branchial cyst.
- ❖ **Usually opens** externally at the lower third of the anterior border of the sternomastoid - lined by squamous or ciliated columnar epithelium.
- ❖ **Often bilateral** in congenital cases with a tiny external opening discharging clear mucoid fluid.

Track course:

The track runs deep to the platysma muscle, ascends along the carotid sheath, courses above the hypoglossal and glossopharyngeal nerve, pass between the internal and external carotid arteries, pass through the middle constrictor muscle and ends at the **supratonsillar fossa of rosenmullar**.



Treatment:

Step ladder operation: through two transverse incisions, one encircling the external opening and one at the level of the hyoid bone.

B- Branchial Cysts: occurs due to persistence of a part of the cervical sinus of His

- ❖ **Though congenital**, it usually appears after the age of 20 years.
- ❖ Globular swelling below the angle of the mandible that lies on the great vessels and may be adherent to the internal jugular vein, thus mobile from side to side and not vertical.
- ❖ Overlapped by anterior border of the sternomastoid muscle.
- ❖ Painless - ovoid - radioopaque.
- ❖ Lined with squamous epithelium and filled with mucoid fluid rich in cholesterol crystals that differentiates it from cold abscess.

Treatment:

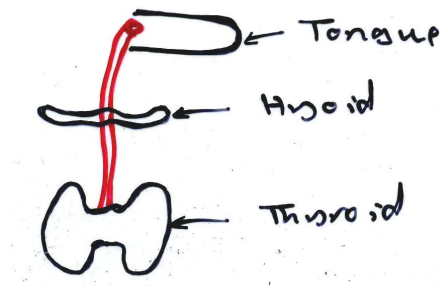
Enucleation through a transverse incision.

N.B : Both branchial sinus and cyst occur due to persistence of the cervical sinus of His.

((Thyroglossal Anomalies))

Embryogenesis:

The thyroglossal tract extends from the foramen coecum at the base of the tongue and descends downwards through the hyoid bone to the thyroid isthmus.



A- Thyroglossal Cyst:

- ❖ **Occurs due to** persistence of a part of the thyroglossal tract - **occurs in** any part of the thyroglossal tract but commonly below the hyoid (**infrahyoid**) - rarely it lies above the hyoid (**suprahyoid**), within the substance of the tongue, or in the floor of the mouth and interfering with speech and swallowing.
- ❖ Rounded, smooth, semitranslucent swelling that is attached to the hyoid bone, so it moves vertically during swallowing and protrusion of the tongue.
- ❖ Filled with mucoid fluid containing cholesterol crystals - lined by cuboid or squamous epithelium and surrounded by fibrous and lymphoid tissue.

Treatment:

- ❖ **Suprahyoid cysts:** enucleated through a transverse incision below the chin.
- ❖ **Infrahyoid cysts:** excised by "**Sistrunk operation**" where the cyst is excised and the track is followed upwards till the foramen coecum at the base of the tongue. The central part of the hyoid bone is excised.

B- Thyroglossal Fistula:

- ❖ Usually follows suppuration in an infrahyoid cyst, so that it **always** opens below the hyoid (**Infrahyoid**).
- ❖ The track is tortuous, and intimately related to the hyoid bone. It is lined by ciliated cuboidal or stratified squamous epithelium.
- ❖ **Always acquired:** Follows rupture or inadequate excision of a thyroglossal cyst.
- ❖ Often palpable as a firm cord which moves upward during swallowing and protrusion of the tongue.
- ❖ Liable to recurrent inflammatory attacks and intermittent mucopurulent discharge.

Treatment:

- ❖ **Sistrunk operation.**
- ❖ Recurrence usually follows simple excision.

Salivary Glands Disorders

ANATOMY

-There are three major salivary glands and from 600 to 1000 minor salivary glands.

- The major glands are

- 1- The parotid gland – It's duct is called "Stenson's duct ". It opens in the oral mucosa bilaterally opposite the upper second molar teeth.
- 2- The submandibular salivary gland – It's duct is called "Wharton's duct" . It opens bilaterally on either sides of the lingual frenum.
- 3- The sublingual salivary gland - It's duct is called " Bartholin's duct" and it either opens in the floor of the mouth or in the stenson's duct.

HISTOLOGY

Components of the adult salivary gland secretion unit:

The acinar cells are enveloped by contractile myoepithelial cells that are surrounded by a basement membrane. Acinar secretions move from the intercalated ducts to the larger striated ducts, both lined by the cuboidal epithelium. The saliva is further transported, with aid from contractile myoepithelial cells into the extralobular ducts that are lined by columnar cells. Ultimately, the saliva gets out from the mucosa through the excretory ducts lined by stratified squamous epithelium Fig (1).

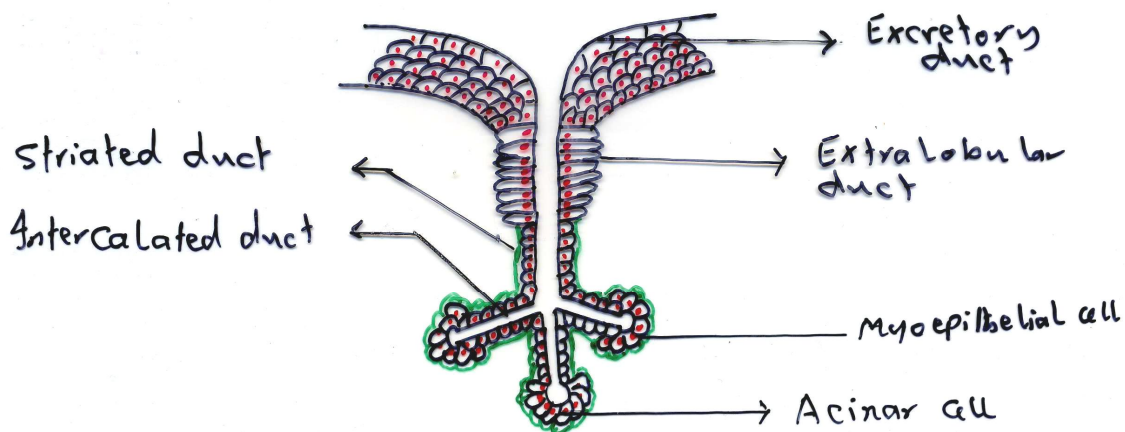


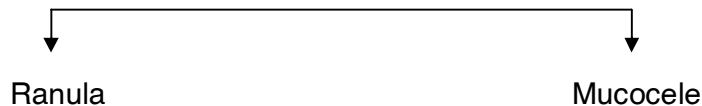
Fig (1) Components of the adult salivary gland secretory unit.

SALIVARY DISORDERS

I - Reactive Disorder

Salivary glands react to injury or obstruction by undergoing atrophic degeneration and necrosis with replacement of the parenchyma by inflammatory cells, and ultimately fibrosis and scarring.

A- Mucous Extravasation Phenomena



⌘ Ranula

Definition:

It is mucous extravasation cyst that occurs at the floor of the mouth as a result of injury to the submandibular duct (Wharton's duct) , the submandibular gland , or the sublingual salivary gland

Clinically:

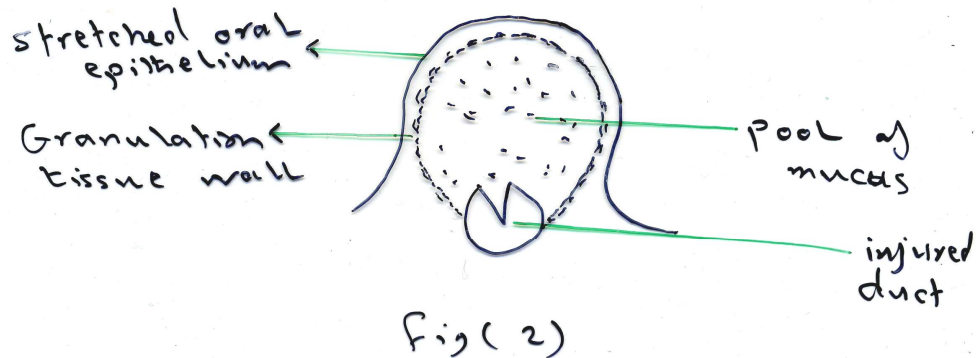
- It is a pseudocyst that has its capsule formed of compressed surrounding tissues. It fulfill all criteria of a cyst like:
 - +ve fluctuation test.
 - soft in consistency
 - aspiration reveals saliva.
- It is present in the floor of the mouth on one side of the tongue and is bluish in color. It is translucent.
- Plunging ranula is a condition in which massive mucous extravasation occur through the myelohyoid muscle into submental, submandibular, or sublingual region. Plunging ranula may cause sever compromise of the airway if the secretion extends deep into the neck and involve the juxtahyiod region.

Complications:

- Air way compromise.
- Compression of the feeder gland = obstructive changes.

Histopathology:

A pool of mucous is surrounded by a granulation tissue wall. The overlying oral epithelium is stretched. Remnants of the injured feeding duct may appear. fig (2)



Treatment:

- small ranula → can be excised
- large ranula → deroofting or marsupialization
- plunging ranula → the underlying feeder gland should be removed to minimize the chance for recurrence.

D.D.:

	<u>Ranula</u>	<u>Demoid Cyst</u>
Type	False	True cyst
Site	Laterally situated	Mostly midline
Color	Bluish	Whitish
Consistency	Soft	Doughy
Fluctuation	+ve	-ve
Transillumination	Translucent	Transopaque
Contents	Mucous	Sebum – Keratin hair - nail - teeth
Treatment	Deroofing	Enucleation
Origin	Mucous extravasation from a major salivary gland duct or gland in the floor of the mouth	germinal epithelium entrapped at the lines of fusion during embryonic development

⌘ Mucocele

- It is a mucous extravasation cyst that occurs as a result of injury of a minor salivary gland duct.
- Usually it is found in the lower lip as a result of lip biting.
- Usually found in children and young adults, although it may occur at any age.
- It is bluish, soft and fluctuant
- D.D.: There are some neoplastic lesions that may clinically resemble mucoceles mainly mucoepidermoid carcinoma. This fact dictated that all suspected mucoceles should be submitted for microscopic examination.

Treatment:

Excisional Biopsy.

B- Mucous Retention Cyst

Definition:

It is a true cystic swelling caused by an obstruction of a salivary gland excretory duct resulting in an epithelial - lined cavity containing mucus.

Clinically:

- More often, mucus retention cysts arise in the oral minor salivary glands. They most commonly occur in the floor of the mouth. They are painless, cystic and fluctuant.
- They rarely involve the major salivary glands, when they do so, they are often multiple (polycystic disease of the parotid gland).
- Clinically, a mucus retention cyst is indistinguishable from a mucocele and may resemble low grade mucoepidermoid carcinoma.

Histopathologically:

The surface stratified squamous mucosal epithelium of the oral cavity is distended by a cystic cavity that is lined by cuboidal epithelium.

C- Sialolithiasis

Definition:

The presence of stones in the salivary system (gland or ducts).

Pathogenesis:

For unknown reasons, it is assumed that congealed mucin, protein, and desquamated ductal epithelial cells form a small nidus on which calcium salts precipitate. The small nidus then allows concentric lamellar crystallization to occur.

Clinically:

- 80% of the stones are formed in the major salivary glands and 20% in the minor one.
- Submandibular gland is affected in 75% of cases, the parotid in 20% and the sublingual in 5% of cases.
- This predilection to the submandibular gland is due to:
 - 1- Undependant drainage (against gravity)
 - 2- Long tortious course of the duct.
 - 3- More viscous secretion.
- The average age is 45 years - stones are rare in children.
- There is no sex preference.
- Although some stones are asymptomatic and are detected on dental radiographs taken for other purposes, most will cause symptoms.
- The chief complaint is painful swelling most often observed at meal times or by direct stimulation of saliva production by a lemon drops.
- Persistent swelling eventually evolve in the gland in patients with chronic obstruction which causes chronic sialadenitis with inflammatory cells and interstitial oedema as a result of salivary stasis.
- The pain is described as pulling, drawing, continuous and severe if the obstruction is complete and mild and transient if the obstruction is partial.

Investigations:

- Ultrasonography can detect the radiolucent stone as most of the salivary stones are radiolucent.
- Occlusal film.
- Lateral jaw film "oblique lateral".
- Panoramic x-ray.
- CT scan
- Sialography → If the obstruction is partial and the dye passed, the proximal ducts appear dilated (sialectasia). If the obstruction is complete, the dye stops short at the site of the stone.

Treatment:

Sialadenectomy (Gland removal)

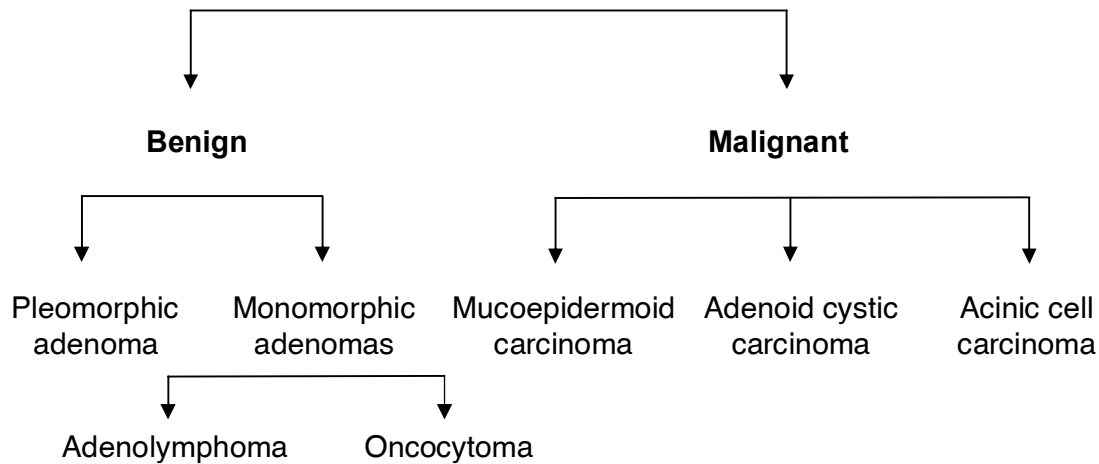
indicated in the following conditions:

- 1- Intraglandular stones.
- 2- Multiple stones within the duct.
- 3- Diffuse glandular calcifications.
- 4- Long standing obstruction with chronic inflammatory process.
- 5- Stone within the proximal part of the duct.

Sialodocholithotomy (removal of the stone from the wharton's duct)

means removal of the stone from the salivary ducts. This is done after performing a proximal holding stitch to prevent backward displacement of the stone. It is indicated if there is a single stone in the distal part of the duct and is palpable in the floor of the mouth.

II - Tumors of the Salivary Glands



Distinguishing features of benign and malignant salivary gland tumors:

Benign	Malignant
Smooth, uniform surface	Nodular Surface
Normal surface coloration	Surface telangiectasia
Regular round or dome shaped	Irregularly shaped
Intact overlying mucosa / skin	Infiltrated or ulcerated
Movable	Fixed and indurated
No pain& no nerve deficits	Pain& nerve deficits

Pleomorphic adenoma (mixed salivary gland tumor)

Definition:

it is the most common benign salivary gland tumor. Different tissue types are observed and is so called mixed.

Clinically:

- It affects the major as well as the minor salivary glands.
- The main major salivary gland that is affected is the parotid followed by the submandibular, followed by the sublingual one.
- Minor salivary gland pleomorphic adenoma occur mainly in the palate, followed by buccal mucosa and the lip .
- Mean age affection is 40 years, however it may affect any age. The female to male ratio is 2-1.
- It is a well defined, freely mobile, soft or slightly firm on palpation. It is generally spherical in shape. Occasionally, tumors that have been present for many years will become lobulated and multinodular.

Histopathologically:

- The most constant finding is the presence of a pronounced fibrous capsule. It is not uncommon for neoplastic nests to perforate the capsule creating a new tumor focus.
- Within the capsule, there is mixed tissues formed of myxoid, chondroid, hyaline and adipose tissue.

Investigation:

- Fine needle aspiration.
- CT scan.
- MRI

Malignant Transformation:

The possibility of malignant transformation increases in the following conditions:

- If left untreated for a long time.
- Multiple recurrence after inadequate surgical excision.
- Previous radiotherapy.

Treatment:

- Adenomas arising in the major gland are treated by lobectomy or sialadenectomy.
- Simple enucleation is contraindicated as recurrence is common due to the presence of extracapsular foci .
- Palatal adenoma are excised together with the overlying mucosa to minimize recurrence.

Monomorphic adenoma

Definition:

Group of minor salivary gland tumors composed of a proliferation of a single epithelial cell type.

WAdenolymphoma

It is the most common monomorphic adenoma that is also called "Warthin Tumor" and "Papillary cystadenoma lymphomatosum".

Clinically:

<i>Site:</i>	mainly affects the parotid gland especially the parotid tail. Rare in other major or minor glands.
<i>Age:</i>	Most cases are discovered in the 6th & 7th decades of life.
<i>Sex:</i>	It has a slight predilection for males
<i>Mobility and consistency:</i>	It usually feels soft and mobile as it is well encapsulated.
<i>Aspiration:</i>	Creamy fluid
<i>N.B.:</i>	10% of the cases are bilateral 5% of the cases are multicentric i.e multiple adenoma within the same gland.

Investigation:

- F N A B
- CT scan is a must before surgery to exclude bilateral or multicentric adenoma.
- Technitium scan: is helpful as the tumor readily takes up the isotope and appears as a hot nodule.

Histopathologically:

Gross examination: Dense fibrous capsule surrounds multiple cystic spaces containing clear, yellow or brown viscous material.

Microscopically: Cystic spaces lined by pseudostratified columnar cells with papillary projections. The papillary projection are supported by large amount of lymphoid tissue.

N.B.: Rare cases of malignant transformation has been reported.

Treatment:

Simple enucleation is adequate for most cases, however, due to the potential for multicentricity, most surgeons recommend superficial lobectomy to prevent recurrence.

Mucoepidermoid Carcinoma

Definition:

It is the commonest salivary malignancy that arise in both major and minor salivary glands.

Clinically:

Age: 30-70 however, it may occur in teenagers.

Sex: There is significant female predilection.

Site: The most common site is the parotid followed by the palate.

Parotid lesions:

- Low grade lesions:

They appear as well defined focal nodules. They may be movable which is an uncommon feature for a malignant lesion. They are often fluctuant. Facial nerve affection is uncommon.

- High grade lesions:

They are usually indurated and fixed to the adjacent tissues. Facial nerve affection may occur.

Oral cavity lesions:

- *Low grade lesions:*

They represent the most cases. They are submucosal masses that have an intact, nonulcerated surface. They are often multiple cystic spaces containing mucin that may give a bluish tinge to the overlying mucosa and are easily mistaken for a mucocele.

- *High grade lesions:*

May show surface ulceration.

Investigation:

- FNAB
- CT
- MRI

Histopathology:

Three dominant cell types are present which are mucous, epidermoid, and intermediate cells.

Low grade type → +mucous cells
+cystic spaces
- epidermoid cells

High grade type → -mucous cells
-cystic spaces
+epidermoid cells

Intermittent grade type → between the high and low grade.

Treatment:

Low grade type:

- Superficial parotidectomy
- facial nerve preservation
- Neck dissection if lymph nodes are palpable.

High grade type:

- total parotidectomy
- facial nerve preservation unless involved
- Radical neck dissection

Intermediate type:

- Total parotidectomy
- Facial nerve preservation
- Radical neck if lymph nodes are palpable.

Adenoid cystic carcinoma

Definition:

It is the most common malignant tumor of the submandibular salivary gland.

Clinically:

Age: It can occur at any age, the peak incidence is in the 6th decade.

Sex: Slight female predilection.

Site: Either major or minor salivary gland.

- The submandibular gland mass becomes quite large before the patient notices its presence. Despite its malignant nature, its growth rate is slow. Over time, the mass becomes indurated and fixed.
- In the parotid, affection of the facial nerve is quite common because it has marked tendency to surround the nerve trunk.
- In the palate:
 - The adenoid cystic carcinoma appears as an eccentric nodule that is usually ulcerated.
 - There may be some palatal paraesthesia due to involvement of the greater palatine nerve.

N.B.:

This tumor has a special predilection for perineural invasion. So, brain metastasis may occur in palatal involvement due to spread along the mandibular and maxillary nerves.

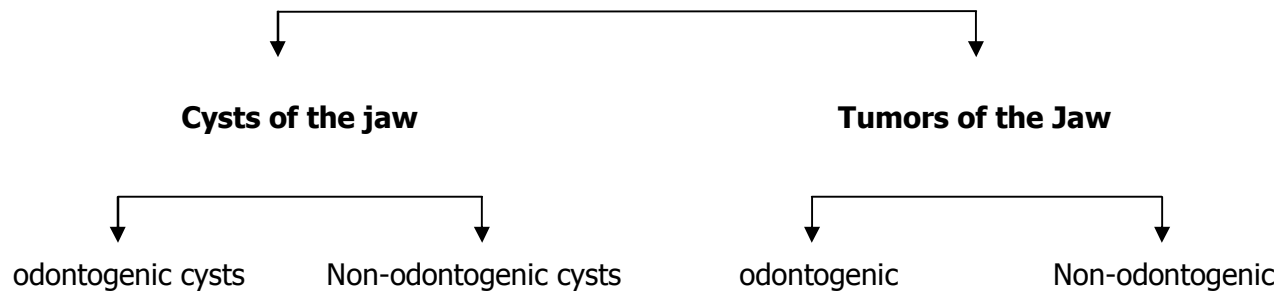
Histopathology:

Swiss cheese appearance where multiple microcystic spaces divides the lobules into multiple cylinders.

Treatment:

- Total sialadenectomy.
- Partial maxillectomy in palatal lesion.

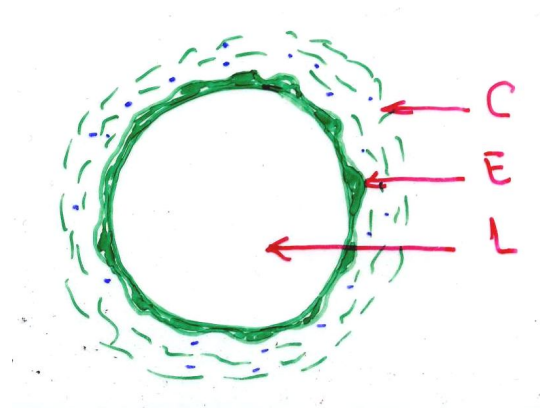
Jaw Swellings



Cystic Swellings

Characters of a cystic jaw swelling:

1. Like other cyst elsewhere, it is composed of three basic structure: a central cavity (lumen), an epithelial lining, and an outer wall (capsule). The central cavity usually contains fluid or semifluid material such as cellular debris, keratin, or mucous. The epithelial lining differs among cyst types.
2. Most cysts of the oral region are true cysts since they possess an epithelial lining. Few cysts are pseudocysts that do not have an epithelial lining (traumatic, aneurysmal and static bone cyst).
3. The cysts may show fluctuation and may show egg-shell cracking sensation.
4. Aspiration through the outer cortex reveals the contents of the central cavity.



((Odontogenic Cysts))

Definition:

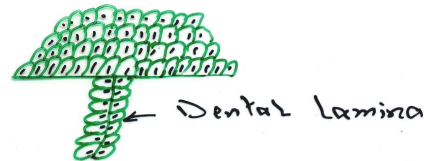
A cyst in which the lining epithelium is derived from epithelium produced during tooth development.

N.B:

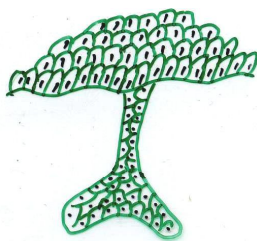
To facilitate understanding of the origin and classification of odontogenic cysts, an understanding of odontogenesis is necessary.

Odontogenesis

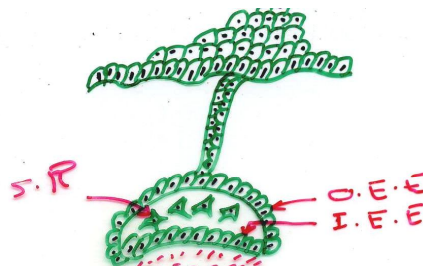
- ❖ Tooth formation originates from the oral epithelium covering the maxillary and mandibular alveolar processes.
- ❖ Budding of the basal cell layer leads to the formation of a solid tube like structure that penetrates the connective tissue and is called the dental lamina.



- ❖ When the appropriate depth is reached, the basal cell layer at the tip of the dental lamina thickens to form a cap like structure (**cap stage**) followed by a bell like structure (**bell stage**), and the epithelium is differentiated into top layer of epithelium (**outer enamel epithelium**) and a bottom layer of epithelium (**inner enamel epithelium**) which forms the enamel. The intervening zone is a loosely arranged star-shaped cells (**stellate reticulum**).

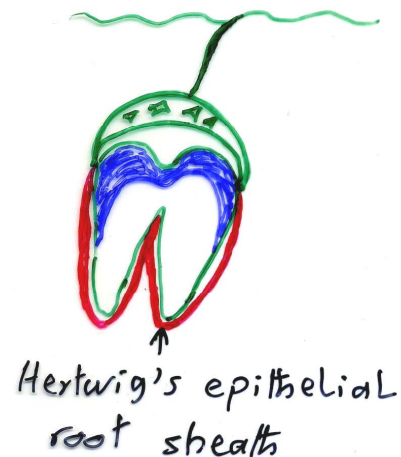
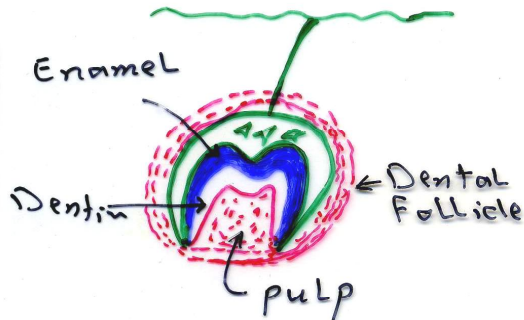


Cap stage

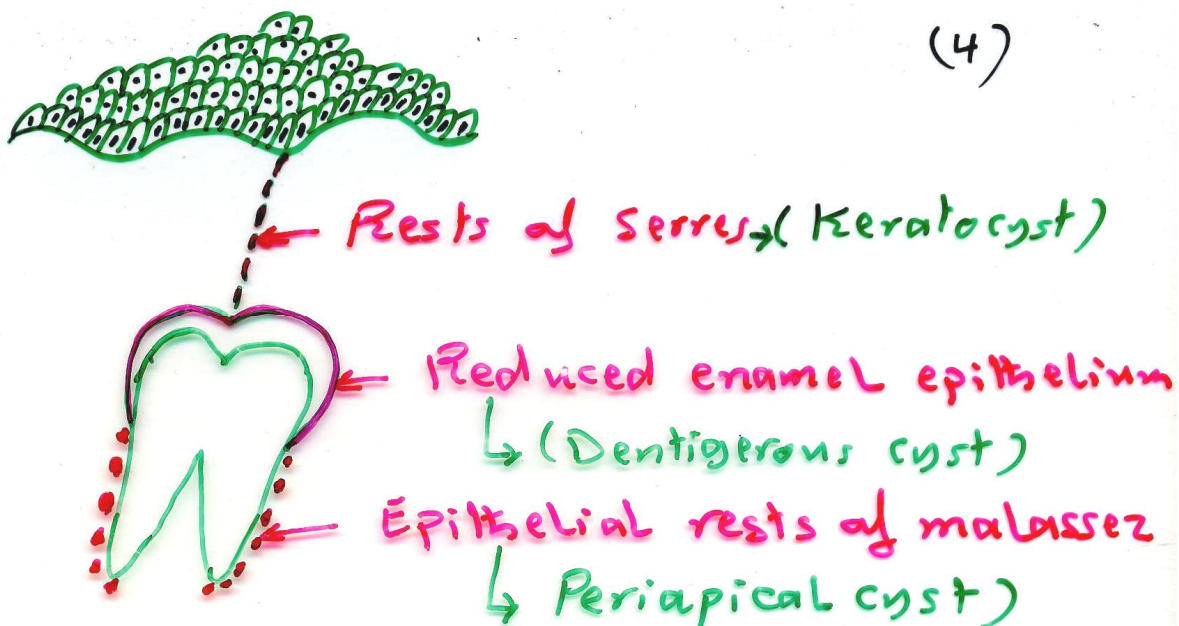


Bell stage

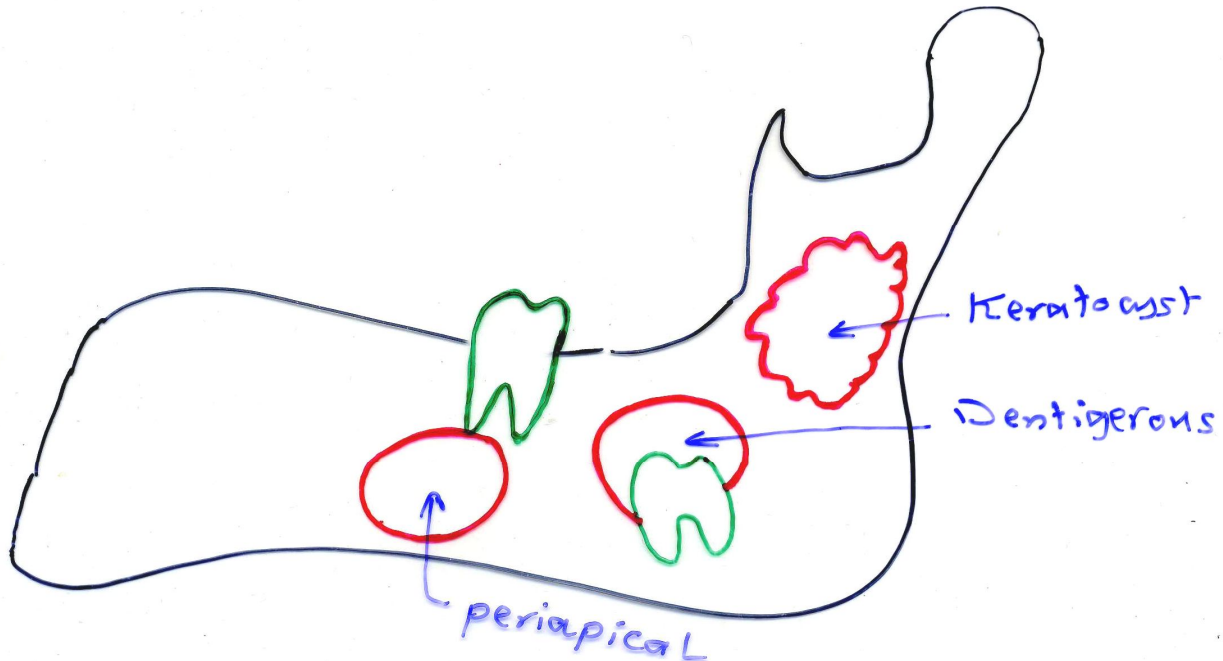
- ❖ This specialized epithelium (O.E.E & I.E.E) induces the adjacent connective tissue to be modified into a circumscribed zone of connective tissue that will form the pulp or dentin. This outer zone of connective tissue that encapsulates the developing tooth bud is dense and fibrous and called the **dental follicle**.



- ❖ The O.E.E & I.E.E as well as the S.R. Collapses into a layer of epithelium that remain around the tooth crown and is called **the reduced enamel epithelium**.
- ❖ After the shape of the tooth crown and root has been formed, a thin transient membrane is formed around the length of the root and forms the **Hertwig's epithelial root sheath**. Remnants of dental lamina is called **rests of serres**. Remnants of the hertwig's epithelial root sheath is called **Rests of Malassez**.



((Odontogenic Cysts (continue)))



A- Periapical Cysts (Radicular C.)

Pathogenesis:

Dental caries → pulpitis → periapical abscess → periapical granuloma → stimulation of epithelial rests of malassez → inflammatory mass → cystic degeneration.

Clinical picture:

It is the most common type of cysts preceded by caries of the corresponding non vital tooth and rarely exceeding 1 cm in diameter.

Radiographic picture:

Rounded well circumscribed periapical radiolucency.

Histopathology:

Cavity lined with a layer of non-keratinized squamous epithelium.

Treatment:

- Caries removal.
- Root canal treatment
- Apicectomy
- Cyst enucleation.

B- Dentigerous Cyst**Pathogenesis:**

Fluid accumulation between the reduced enamel epithelium and the enamel surface, resulting in a cyst in which the crown is located within the lumen of the cyst and the roots are located outside .

Clinical picture:

- Commonly associated with unerupted mandibular or maxillary 3rd molar as well as maxillary canines.
- Usually remains asymptomatic but may produce some pain or swelling particularly if large or inflamed.
- Missed tooth in the arch.

Radiographic picture:

Well-circumscribed radiolucency surrounding the crown of the tooth.

Histopathology:

The cystic cavity is lined by non-keratinized, stratified, squamous epithelium.

Complications:

- Epithelium may become keratinized → Keratocyst transformation.
- May change into Ameloblastoma.
- Dysplasia of the epithelium → Squamous C.C.
- Variable numbers of mucus cells are seen in the epithelial lining that may undergo mucus metaplasia → Mucoepidermoid carcinoma.

Treatment:

- Enucleation + tooth extraction.
- Maxillary canine = The cyst maybe enucleated or marsupilized and the tooth brought into proper alignment in the arch with the aid of an orthodontic appliance.

the

C- Odontogenic Keratocyst.**Pathogenesis:**

odontogenic Keratocyst originates from:

1. Rests of serrs which are the remnants of the dental lamina.
2. Lining of the dentigerous cyst.

Clinical Picture:

- Occure in patients with a wide range of age from 1st to 8th decade with peak incidence in the 2nd and 3rd decade.
- Usually present as a single lesion, occasionally occur as a multiple cysts that sometimes occupy all four quadrants of the jaw. Multiple odontogenic keratocysts are one of the constant features of **Basal cell nevus syndrome** which is an autosornal dominat syndrome. Predominant features of this syndrome in addition to multiple keratocysts are, multiple basal cell carcinomata, pseudohypertelorism, palmar pits, planter pits, bifid ribs and spina bifida.
- OKC differs significantly from other odontogenic cysts in that:
- It possess a high growth potential greater than other odontogenic cysts, and can attain a largerr size resulting in massive bone destruction.
- OKC exhibits a recurrence rate of 25% to 60%, similar to that of a neoplsm owing to the presence of a daughter cysts and microcysts nearby the original one.

Radiographic picture:

well-defined solitary lesion or multilocular polycystic radiolucency exhibiting a thin corticated margin unless the cortex is perforated.

Histopathology:

1. The cyst is lined with keratinized stratified squamous epithelium.
2. The lumen contains variable amounts of keratin.
3. The capsule wall contains microcysts.

Complications:

- Ameloblastoma.
- Sq. C.C.
- Mucoepidermoid C.

Treatment:

- Intact cortex = Enucleation
- Perforated cortex = Resection.

N.B: Marsupilization is ineffective in reducing the size of a keratocyst.

((Non-Odontogenic Cysts))

1- Nasopalatine duct cyst

- Also called incisive canal cyst that arises from the embryonic remnant of the nasopalatine duct.
- Develop in midline of the anterior maxilla near the incisive foramen.
- Most of them are asymptomatic and discovered during routine radiologic examination as well-demarcated-oval-shaped radiolucency of the midline extended between the roots of the central incisors.
- It is enucleated via a palatal approach.

2- Nasolabial Cyst

- It is a developmental cyst of soft tissue of the muco-buccal fold beneath the ala of the nose, mostly derived from remnants of the inferior portion of the nasolacrimal duct.

- Appears as a unilateral or bilateral painless soft tissue swelling that results in flattening of the nasolabial crease on the skin below the ala of the nose, and if the upper lip is retracted, the cyst can be seen intraorally as a swelling located at the depth of the maxillary vestibule.
- Not apparent radiologically because it is located within the soft tissue.
- Removed by enucleation.

3- Globulomaxillary Cyst

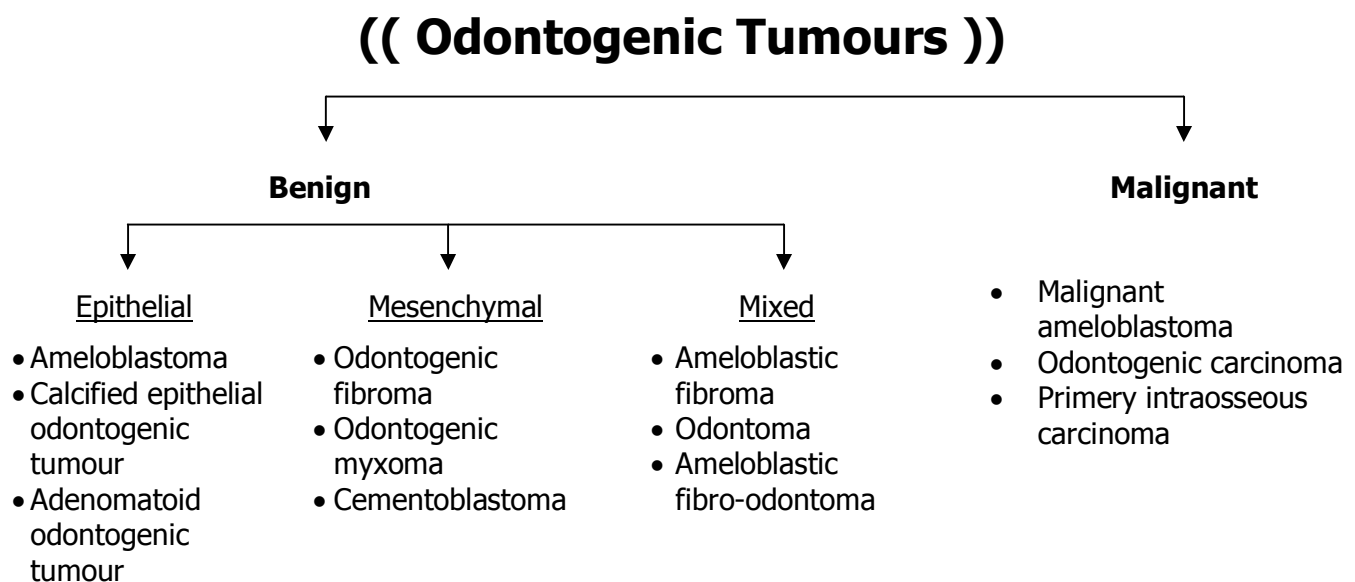
It occurs in the alveolus between the premaxilla and the maxilla (between the lateral incisors and the canine tooth). It frequently causes displacement of the neighboring teeth.

4- Median Maxillary Palatal Cyst

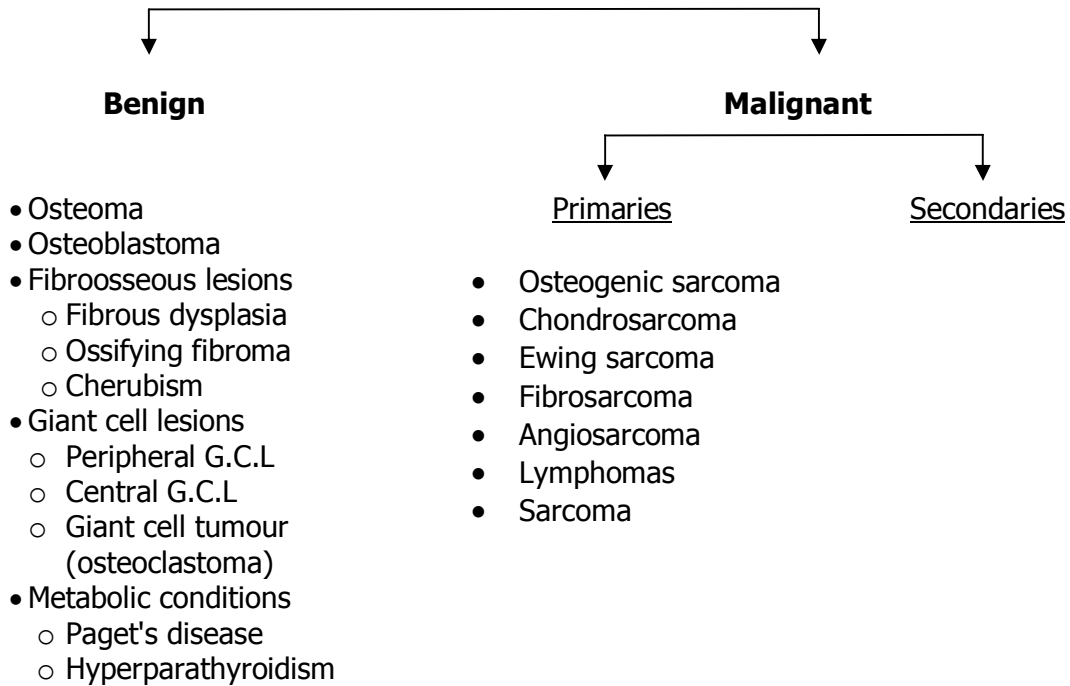
It occurs in the midline between the palatal shelves and may involve the nose and the maxillary sinus.

5- Median Mandibular cyst

Extremely rare and occurs at the mandibular symphysis.



((Non-odontogenic tumours))



Ameloblastoma

Definition:

Benign, epithelial, slowly growing, locally aggressive neoplasma of odontogenic epithelium.

Origin:

- Rests of serres
- Rest of malassez
- Reduced enamel epithelium
- Basal cell layer of overlying surface epithelium.
- Lining epithelium of the dentigerous cyst.

Clinical subtypes:

- Common (polycystic) ameloblastoma
- Unicystic ameloblastoma
- Extraosseous (peripheral) ameloblastoma

Clinical picture:

Age: occurs at any age but commonly occurs between 20 - 40 years.

Sex: No significant sex or race predilection.

Site:

- Polycystic type → most commonly occurs in the mandible in the molar and ascending ramus.
- Unicystic type → most commonly occurs in the maxilla in the molar area.

Characteristic features:

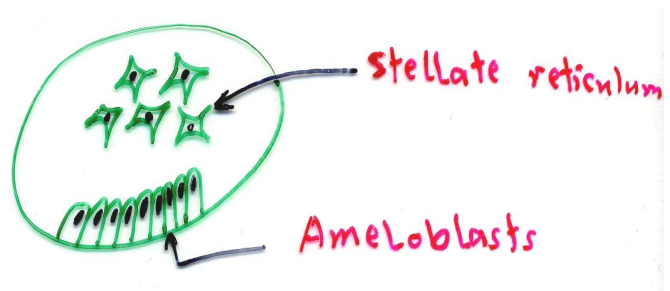
- Tendency to expand the bony cortices (buccal and lingual) because their slow growth allow time for the periosteum to produce a thin shell of bone ahead of the expanding lesion → Eggshell cracking.
- Extensive deformity of the mandible or the maxilla.

Radiographic picture:

- Multilocular radiolucency → soap bubble appearance.
- Root resorption of the corresponding teeth.

Histopathology:

The classic microscopic appearance of an ameloblastoma consists of epithelium in which the basal cell layer contains columnar cells that have a tendency for the nucleus to move from the basement membrane to the opposing end of the cell, a process referred to as reverse polarization.



Histopathological types:

- Follicular type.
- Acanthomatous type.
- Granular cell type.
- Plexiform type.

Treatment:

- Resection of the mandible (Segmental mandibulectomy). Hemimandibulectomy may be needed. Hemimaxillectomy may be needed in very large lesions.
- Reconstruction of the mandible or maxilla.

Odontoma

- ❖ Mixed odontogenic tumor composed of mature enamel, (ectodermal) dentin, and pulp (mesodermal).
- ❖ Maybe (compound) → multiple radiopaque structures in the anterior part of the mouth.
- ❖ Maybe (complex) → a solid radiopaque mass found in the posterior part of the mandible.
- ❖ Treated by enucleation.

Giant cell Tumour (osteoclastoma)

- ❖ It is a tumor of the mandible or maxilla that contains giant cells.
- ❖ It is an aggressive tumour with buccal and lingual expansion, cortical bone perforation and root resorption.
- ❖ Treated by resection.

Peripheral Tumours

Definition:

Solid swelling situated on the gum. They are called peripheral swellings "Epulides".

Types:

A- Peripheral fibroma "Fibrous epulis":

It is a soft fibroma arising from the periodontal membrane in response to chronic irritation. It is small pedunculated swelling lying usually between the incisor teeth of the lower jaw. Treated by local excision + deep scaling or extraction of the related teeth plus covering the raw area by local flap.

B- Peripheral giant cell granuloma "Myeloid Epulis":

It arises in the alveolar margin and consists of giant cells, fibroblasts and fibrous tissue. It forms a sessile lobulated smooth purple swelling. It is treated by wide excision and covering the raw area by local flap. Biopsy is a must to rule out brown tumors of hyperparathyroidism.

C- Granulomatous Epulis "Pyogenic granuloma":

It is a mass of granulation tissue, covered by pyogenic membrane that bleeds easily on touch. It is treated by curettage + extraction of the offending tooth.

D- Malignant Epulis "Peripheral carcinoma or sarcoma" :

It shows the criteria of a malignant mass or ulcer and treated by radical excision and neck dissection in clinically +ve neck.

Other peripheral swelling:

- Peripheral ameloblastoma.
- Peripheral ossifying fibroma.
- Peripheral CEOT "central epithelial odontogenic tumor".

Fascial Space Infection of Dental Origin

Causative organisms

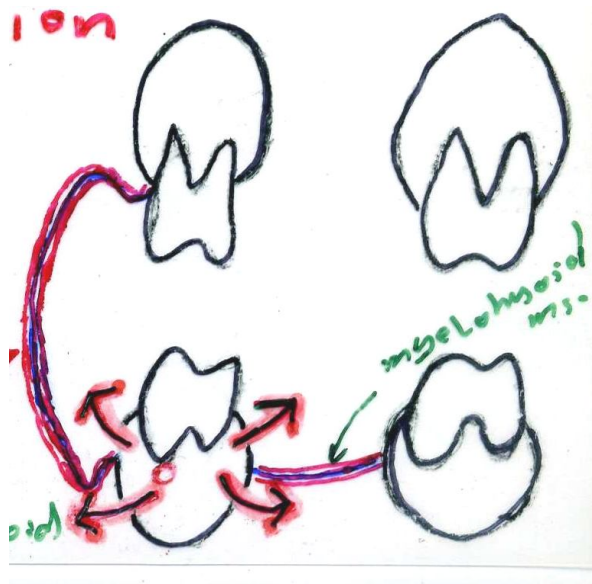
- Aerobes
- Staph- Strept
- E-Coli
- Proteous
- Pseudomonos-Klebsiela
- Anaerobes
- Bacteriods
- Streptococi
- Fusispirocats(3)

Clinical Picture:

- Swelling
- Redness
- hotness
- tenderness
- pain
- fever
- chills
- headache
- lymphadenopathy
- trismus

Pathways of dental infection (Fig 1)

- Pulpitis → periapical abcess →
- Perforation of the buccal cortex and the infection spread either above or below the buccinator.
- Perforation of lingual cortex → spread above or below the myelohioid



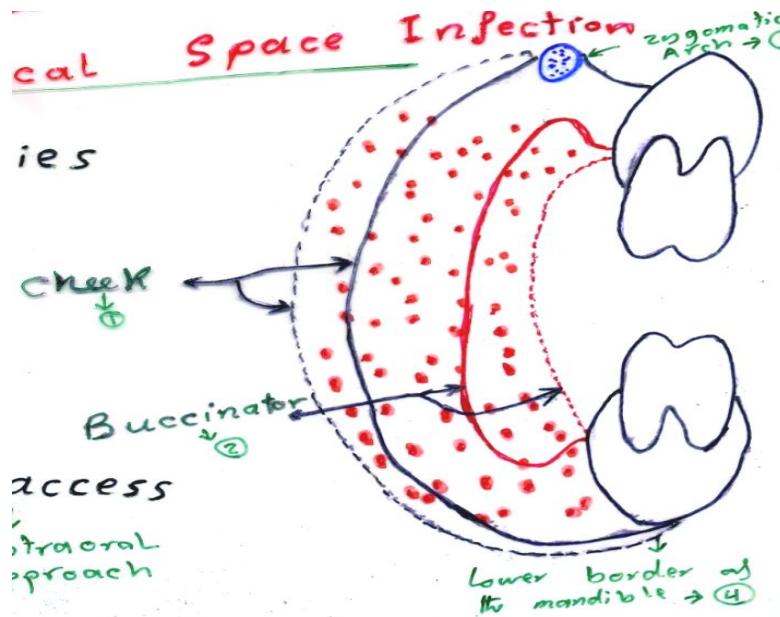
Fig(1)

Types of fascial spaces:

- Buccal space infection.
 - Masticator space infection:
 - * Submasseteric
 - * Pterygomandibular
 - * Temporal space.
 - Sublingual space.
 - Ludwig's angina.
 - Lateral pharyngeal space.
 - Retropharyngeal space.
-

Buccal Space Infection

- **Boundaries:** Fig(2)
 - Lateral : Cheek skin
 - Medial : Buccinator muscle
 - Superior : Zygomatic arch
 - Inferior : Lower border of the mandible
- **Surgical access:**
 - Intraoral approach.



Fig(2)

Masticator Spaces

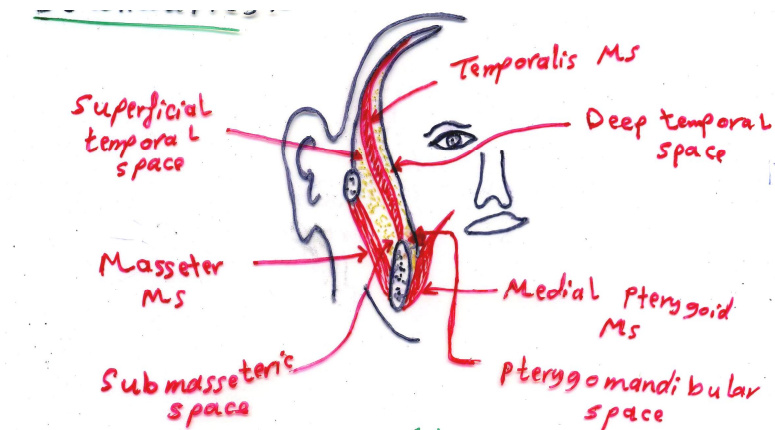
- *Submasseteric.
- *Pterygomandibular.
- *Temporal

Boundaries Fig(3)

The submasseteric space lies between the masseter muscle and the mandible. The pterygomandibular space lies between the medial pterygoid muscle and the mandible. The superficial temporal space lies between the temporalis muscle and the skin in the temporal area. The deep temporal space lies between the temporalis muscle and the temporal bone.

Surgical access:

All can be drained intraorally or extraorally.



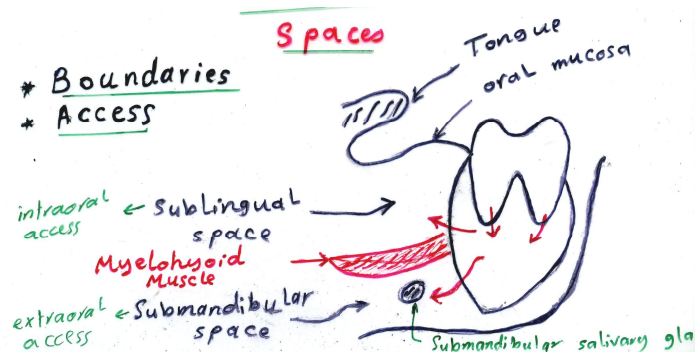
Fig(3)

Sublingual and Submandibular Spaces

Boundaries Fig(4) :

The sublingual space is bounded by the oral mucosa from above and by the mylohyoid muscle from below. The submandibular space is bounded by the mylohyoid muscle from above and by the skin from below.

Access: The sublingual is drained intraorally while the submandibular is drained extraorally.



Fig(4)

Ludwig's Angina

Definition:

- Bilateral infection of the sublingual and submandibular spaces

C.P:

- Brawny edema.
- Elevated tongue.
- Airway obstruction.

Principles of treatment:

- Early diagnosis.
- Establishment of patent airway.
- Prompt an adequate surgical drainage.
- Extraction of offending tooth.
- Careful follow up by: antibiotic - Parental rehydration - frequent dressing

Lateral Pharyngeal Spaces

Boundaries:Fig(5)

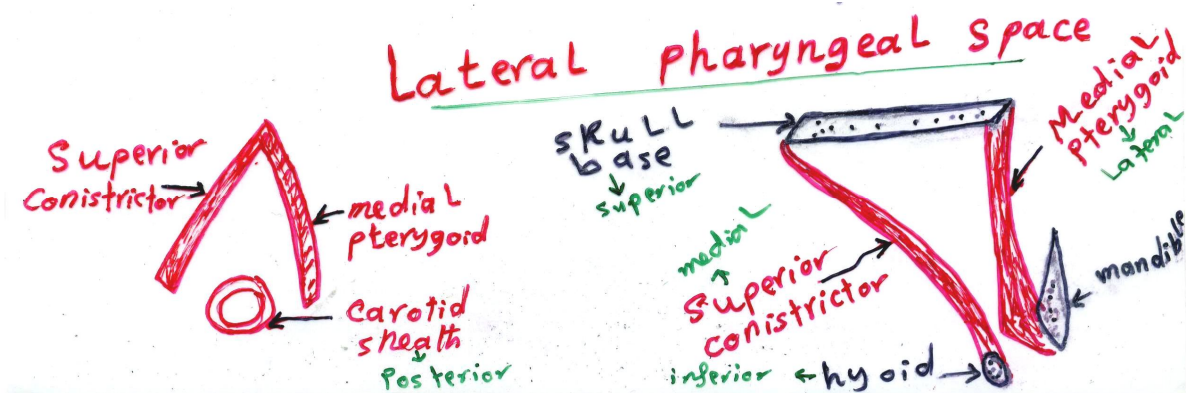
Above: Skull base

Lateral:Medial pterygoid

Medial:Superior constrictor

Posterior:Carotid sheath

Below:Hyoid bone



Fig(5)

C P :

- Pain, fever, chills
- Bulging of the lateral pharyngeal wall.
- Dysphagia = Trismus.
- Swelling below the angle of the mandible

Surgical Access:

- Drainage → Extraoral or intraoral
- Keep patent airway

Retropharyngeal Spaces

Boundaries:

- *Above* → skull base
- *Posterior* → Prevertebral fascia
- *Anterior* → Deep cervical fascia that extends from the pharynx and oesophagus to the carotid sheath.
- *Inferior* → extends down to the superior + posterior mediastinum.

C.P.:

- Dysphagia - dyspnea.
- Bulging of the posterior pharyngeal wall.
- Neck rigidity.
- X-ray = widening retropharyngeal space.

Treatment:

- Patent airway.
- Prompt drainage.

COMPLICATIONS

- Airway obstruction
- Cavernous sinus thrombosis
- Necrotising fascitis
- Brain abscess
- Mediastinitis and mediastinal abscess
- Empyema

Maxillofacial Injuries

Etiology of injury

- road traffic accidents
- sport accidents
- fights & falls
- fire arms (gun shots and shot guns)

Factors affecting the displacement of the fractured segments

- 1- the degree of force
- 2- the direction of the force
- 3- the resistance offered by the facial bones to the force
- 4- the cross-sectional area of the agent or object struck
- 5- the attached muscles

Classification of fractures

1- Simple

Linear fractures which are not in communication with the exterior

2- Compound

An extra oral or intra oral wound is present involving the fracture line with a consequent potential for infection.

3- Comminuted

Shattering of bone into multiple fragments (gunshots)

4- Complicated

The injury also involves the adjacent nerves, vessels or joints.

5- Impacted

Linear fractures interdigitate to such an extent that there is no appreciable clinical movement.

6- Green stick

In children due to the elasticity of the bones (fractures of the neck of the condyle).

7- Pathological

Spontaneous fracture of bone as a result of a normal degree of muscle contraction or following a minor trauma should always arouse suspicion that there is some underlying pathological condition (hyperparathyroidism)

8- Single or multiple

9- Favorable and unfavorable

10- Unilateral or bilateral

Clinical presentations of the fractures

History

- 1- History of trauma
- 2- Pain at the site of trauma
- 3- Malfunction (inability to open or to close the mouth)]
- 4- Facial swellings
- 5- Facial wounds
- 6- Oral bleeding

Inspection

- 1- Facial oedema
- 2- Facial wounds (internal or external)
- 3- External bleeding
- 4- Malocclusion or step in the occlusion
- 5- Difficulty and sometimes inability to open or to close the mouth
- 6- Facial asymmetry

Palpation

- 1- marked tenderness at the site of fracture
- 2- crepitus at the site of fracture
- 3- Malocclusion
- 4- Bleeding from the fracture site during manipulation

Radiological diagnosis

A- Conventional X-rays

- panoramic x-rays
- occipito-mental x-ray
- submento – vertex x – ray
- posteroanterior – x – ray
- lower occlusal x- ray

B- CT scan of the facial bones

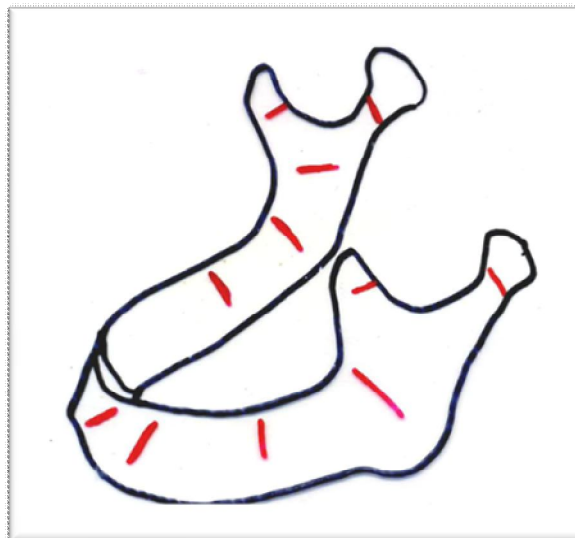
- coronal CT
- 3 DCT (Three dimensional)

Sites of mandibular Fractures

- 1- Fractures not involving the basal bone of the mandible
(Dentoalveolar Fractures) which is most frequently observed in the incisor region .
- 2- Fractures involving the basal bone of the mandible. They may be single, multiple, unilateral on bilateral.

Single unilateral Fractures

- 1- Symphyseal – Midline Fracture between the two centrals.
- 2- Parasymphyseal – Fracture distal to the central incisor
- 3- Body of the mandible – fractures distal to the canine tooth
- 4- Angle of the mandible – fractures at the junction of the body and ramus
- 5- Ramus of the mandible – Fractures distal to the angle
- 6- Condyle – Extracapsular& Intracapsular
- 7- Coronoid



MIDFACE FRACTURES

SITES OF MIDFACE FRACTURES

- 1- Dentoalveolar Fractures
- 2- Fractures of the nasal bones
- 3- Fractures of the zygoma
- 4- Fractures of the maxilla
- 5- Le Forte Fractures
- 6- Nasoethmoidal fractures
- 7- Orbital wall fractures

Fractures of the zygoma

- The zygoma may be fractured at one of 4 sites
 - zygomatic arch
 - Frontozygomatic suture
 - Infra orbital margin
 - Zygomatico – maxillary buttress
- So, Fractures of the zygoma may be
 - monopodal
 - bipodal
 - tripodal
 - tetrapodal
- The zygoma may rotate around a vertical axis or around a horizontal axis
- Fractures of the zygoma is usually associated with depression of the midface and limited mouth opening due to compression of the fractured zygomatic arch on the moving mandibular coronoid process

Le Forte Fractures

Le Forte I :-

- It is a horizontal Fracture line above the level of the floor of the nose. It passes horizontally from the piriform apertures, laterally in the anterior maxillary wall and ends in the lower part at the pterygoid plate.

Le forte II :-

It is a pyramidal shaped fracture .it begins in the fronto- nasal suture, descends in the medial orbital walls, descends in the infra orbital margin, runs beneath the zygomatico-maxillary suture, traverses the lateral wall of the antrum and ends in the middle of the pterygoid plate .

Le fort III

:-

It separates the mid face from the cranial base. The fronto-zygomatic sutures bilaterally and the frontonasal sutures are opened . The zygomatic arch is fractured.

Fractures of the orbital walls

- Fractures of the orbital floor may be associated with herniation of the orbital fat inside the maxillary sinus . Entrapment of the extraocular muscles inside the fracture lines may occur. This condition is called orbital blow out due to increased orbital volume. This is associated with enophthalmos , limited ocular mobility and diplopia

Treatment of facial Fractures

- Threats to life should be recognized and treated without delay:-
 - A- Airway and cervical spine control
 - B- Breathing, ventilation
 - C- Circulation and haemorrhage control
- Maxillofacial injuries may compromise the airway due to one or more of the following factors
 - 1- Obstruction of the nasal and oral airways by blood clot, saliva, bone, teeth or parts of dentures.
 - 2- Inhalation of any the above
 - 3- Obstruction of the nasopharynx and oropharynx by backward displacement of the tongue and its attachments in bilateral parasymphyseal fractures.
 - 4- Occlusion of the oropharynx by downward and backward displacement of a fractured maxilla

- Airway Control may entail

- Chin traction
 - Nasopharyngeal airway
 - Good suction
 - Inserting an airway(oropharyngeal)
 - Endotracheal intubation
 - Oxygen mask
- It is important to recognize the risk of cervical spine injury and to prevent movement of the cervical spine while attempting to achieve a patent airway. Therefore, the patient's head and neck should not be hyperextended or hyperflexed to establish or maintain an airway.

Management of bony injuries

- The aim of treatment of any fractures is to approximate and fix the fractured segments.
- Fixation may be done by one of two ways
 - 1- **Closed reduction (Indirect fixation)**Utilizing the standing teeth to place the teeth in the normal occlusion and immobilize them in that position and so indirectly reduce the bone fragments is the simplest and most commonly used method of treating mandibular fractures (IMF or intermaxillary fixation).

2- **Open reduction (Direct fixation)**

- The method of choice in the majority of displaced facial fractures. It is done by performing anatomical reduction and direct fixation of the fractures utilizing titanium plates and screws

Disadvantages of indirect fixation:-

- 1- needs postoperative close monitoring
- 2- secretion retention in patients with chronic airway disease
- 3- IMF may interfere with nursing and suction in head injured patients
- 4- weight loss (6-5 kg per month)

Disadvantages of direct fixation:-

- 1- Needs general anaesthesia
- 2- Expensive

Oral Cancer

Incidence:

Oral cancer represents 3% of all cancers in males and 2% of all cancers in female.

Oncogenes:

They are cancer producing genes. They stimulate certain proteins "**Kinases**" that stimulate the process of mitosis and neoplastic growth.

Antioncogenes:

They are cancers suppressor genes. They stimulate certain proteins "**Cyclins**" that inhibit mitosis.

Carcinogeneic Factors:

1. Tobacco:

- a. Smoked tobacco (cigar, cigarette, pipe, goza)
- b. Smokless tobacco (Quid, snuff, chewing tobacco)

2. Actinic radiation:

Light – skinned individuals who sustain prolonged occupational exposure to direct sunlight are at a greater risk of developing squamous cell carcinoma of the lower lip. The condition is proceeded by actinic chellitis in which there is hyperkeratosis, epithelial atrophy and dysplasia. The exposedd mucosal surface appears mottled "red due to atrophy and white due to hyperkeratosis".

3. Infections:

- a. Bacterial: Treponema pallidum (syphilitic mucous patches)
- b. Fungi: Candida Albicans.
- c. Viruses: HPV (human papilloma virus) – EPV (Ebstein Bar virus) – HIV (Human Immunodeficiency)

4. Immunosuppression:

AIDS:- Oral Kaposi sarcoma and lymphoma in AIDS having patients are much more common than squamous cell carcinoma.

5. Nutritional deficiencies:

Plummer-Vinson syndrome: Patients with chronic iron deficiency anaemia are at a higher risk of developing oral and oesophageal cancer.

6. Preexisting oral diseases:

- a. Oral Submucous fibrosis.
- b. Oral lichen planus: is still being debated.

7. Cofactors:

- a. Alcohol consumption.
- b. Chronic irritation "ill-fitting dentures"
- c. Liver cirrhosis.

Clinical Picture:

- The most common early presentation of intraoral squamous cell carcinoma: are leukoplakia and erythroplakia.
- The more advanced lesion may appear as:
 - Malignant ulcer → has indurated base, raised nodular everted edge and necrotic floor.
 - Malignant mass → hard – fixed.
 - Ankyloglossia i.e fixation of the tongue due to infiltration of the muscles of the floor of the mouth.
 - Profuse salivation.
 - Halitosis "bad oral smell".
 - Pain referred to the ear along the chorda tympani.
 - Haemorrhage from eroded lingual blood vessels.
 - Difficulty in swallowing and articulation.
 - Loosening or loss of the teeth due to invasion of the underlying bone of the mandible or maxilla.
 - Paraesthesia of the lower lip and tongue due to the infiltration of the inferior alveolar nerve.
 - Nasal obstruction and epistaxis.
 - Diplopia → if the tumor infiltrates the extraocular muscles.
 - Lymphadenopathy "clinically +ve neck" → enlarged, firm, fixed.

N:B

Tongue cancer patients should be examined for tongue mobility. The tongue when protruded is deviated to the affected side due to infiltration of the ipsilateral hypoglossal nerve.

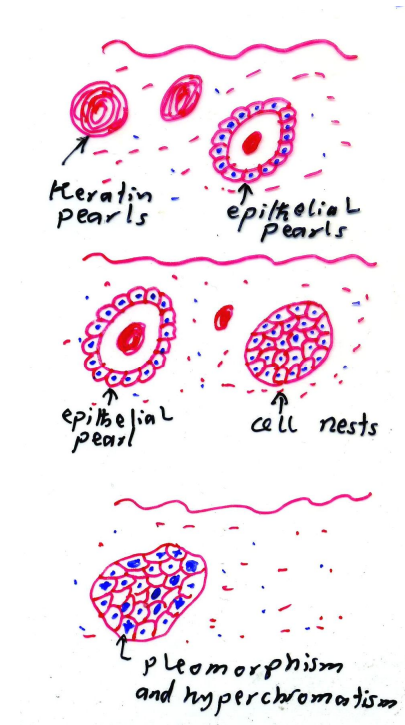
Histopathology:

- Squamous cell carcinoma:

Is the most common malignant neoplasm of the oral cavity representing approximately 90% of all oral cancers.

- It may be:

- Well differentiated: contain significant amount of keratin, and the tissue resembles normal stratified squamous epithelium. It has the best prognosis.
- Moderately differentiated: contain little keratin. The tissue still could be recognized as stratified squamous epithelium.
- Poorly differentiated: There is no keratin with lack of normal architecture and marked atypia. It has worst prognosis.



Site and incidence:

<u>Site</u>	<u>Relative incidence</u>
Lower lip	35 %
Lateral tongue	25 %
Floor of the mouth	20 %
Soft palate	15 %
Gingival / alveolar ridge	4 %
Buccal mucosa	1 %

N.B.:

Squamous cell carcinoma of the lower lip tends to be well differentiated. Those that occur on the lateral border of the tongue are often moderately differentiated. Those that occur on the posterior third of the tongue and tonsillar region tend to be poorly differentiated.

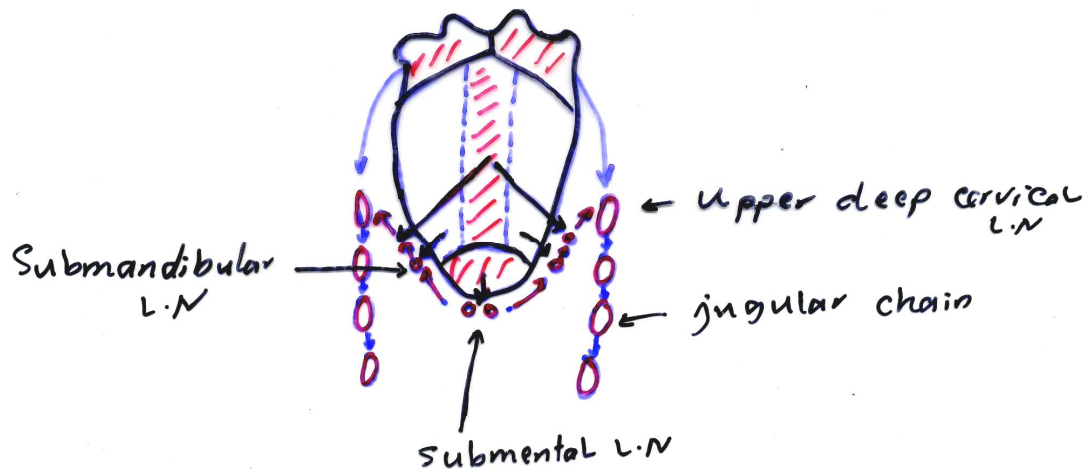
Spread:

A. Direct:

Tongue cancer of the anterior two thirds may spread to the gums or to the floor of the mouth. Those of the posterior third may spread to the soft palate and pharynx.

B. Lymphatic:

- Lip Carcinoma* → submental, submandibular and upper deep cervical lymph nodes.
- Tongue cancer metastasis*:



- Lesions of the tip → submental, submandibular and jugular on both sides.
- Lesions of the anterior two thirds → submandibular and jugular on one side.
- Lesions of the anterior two thirds extended to within 1 cm of the midline → Bilateral lymph nodes metastasis.
- Lesions of the posterior thirds → metastasis to both jugular chains.

C. Haematogenous Spread:

Often to the lungs.

Clinical staging of head and neck cancer (TNM):

(T) "Primary Tumor"

T1 → Tumor size is less than 2 cm.

T2 → Tumor size 2 – 4 cm.

T3 → Tumor size 4 – 6 cm.

T4 → Tumor size is more than 6 cm.

(N) "Regional lymph nodes"

N0 → No palpable lymph nodes.

N1 → Palpable ipsilateral L.N

N2 → Palpable contralateral L.N. or bilateral L.M.

N3 → Large fixed L.N. "more than 6 cm in its greatest dimension.

(M) "Distant metastasis"

M0 → No distant metastasis.

M1 → Clinically or radiologic evidence of metastasis.

Stage (I)	→	T1	N0	M0		
Stage (II)	→	T2	N0	M0		
Stage (III)	→	T3	N0	M0		
	→	T1	T2	T3	N1	M0
Stage (IV)	→	T4				
	→	N2	N3			
	→	M1				

Treatment of Oral Cancer:

- Surgical excision.
- Radiotherapy.
- Chemotherapy.
- Combination.

A. Lower Lip Cancer:

Usually it is well differentiated and often diagnosed at an early stage, and can usually be cured by local excision.

B. Carcinoma of the lateral border of the tongue or floor of the mouth:

Are usually moderately or poorly differentiated, diagnosed at a later stage and quicker to metastasize. So, they need combined surgery, radiotherapy and chemotherapy.

(1) Surgery:

- Local excision:
 - The aim is to excise the lesion with 2 cm safety margin all around.
 - This may entail partial, hemi or total glossectomy.
 - Indicated in early cases.
- Radical neck dissection:
 - On one or both sides.
 - Done even if the glands are not palpable as 30% of the clinically no neck are pathologically +ve neck.
- Commando operation (combined mandibulectomy and neck dissection):
 - The aim of the commando operation is to remove the lesion in continuity with the lymphatic drainage area.
 - Indicated for advanced cases involving the tongue, floor of the mouth, mandibular or cheek.

(2) Radiotherapy:

- Postoperative indications:
 - No safety margin.
 - More than one pathologically positive lymph node.
 - Perinodal infiltration.
 - Postoperative recurrence
- Preoperative indications:
 - Large primary T4
 - Alternative to excision in early cases.
 - Tumours of the posterior third of the tongue..
 - Inoperable cases.

(3) Chemotherapy:

- Preoperative "New adjuvant" → Down size and not down stage of the tumor.
- Postoperative "Adjuvant" → Chemotherapy.

INVESTIGATIONS

- **Biopsy**
 - incisional
 - excisional
 - aspiration
 - true cut needle
 - Frozen section
- **Plain X-ray chest**
- **Abdominal sonography**
- **CT scan(lesion-chest-spine) to detect the local and the systemic extension including the associated lymph nodes**
- **MRI**

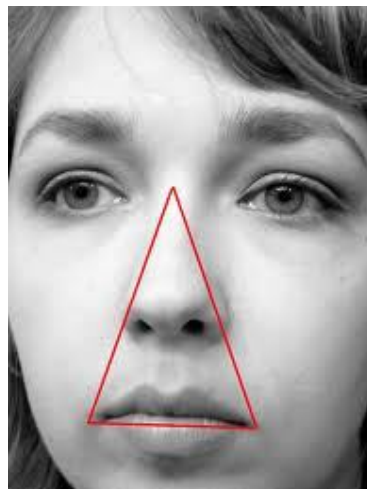
The Dangerous Triangle of the Face

It consists of the area from the corners of the mouth to the bridge of the nose, including the nose and maxilla. Due to the special nature of the blood supply to the human nose and surrounding area, it is possible (although very rare) for retrograde infections from the nasal area to spread to the brain.

This is possible because of venous communication (via the ophthalmic veins) between the facial vein and the cavernous sinus. The cavernous sinus lies within the cranial cavity, between layers of the meninges and is a major conduit of venous drainage from the brain.

If the cavernous sinus gets inflamed it will constrict the structures that are going through it or surround it. Inside cavernous sinus we can find constriction of the following nerves: CN III (oculomotor nerve), CN IV (trochlear nerve), CN VI (abducens nerve), CN V (trigeminal nerve), specifically V1 (ophthalmic nerve) and V2 (maxillary nerve) branches. Failure of each of the nerves listed above will manifest in loss of function of the specific muscle, gland or a parasympathetic innervations (from CN III). In addition, it is possible that inflammation of the cavernous sinus will result in compression of the optic chiasm (resulting in vision problems) and/or the pituitary gland.

Failure of CN III will result in loss of function of the following eye muscles: medial rectus, superior rectus, inferior rectus, as well as muscles that are responsible for opening the eyelid: levator palpebrae superioris muscle and the superior tarsal muscle (Muller's muscle). CN III damage also results in loss of parasympathetic innervation of the eye (loss of pupillary constriction and lens accommodation).



Techniques Of Defect Closure

1- **Direct Closure** : (with or without Undermining)

2- **Skin Grafts** :

- Partial Thickness " Thiersh graft "
- Full Thickness " Wolf graft "

3- **Flaps** :

A) Classified According To the Blood Supply into :

1- *Axial Flaps* : depends up on a definite blood vessel

2- *Random Flaps* : doesn't depend on a definite blood vessel

The length to width ratio should not exceed 2:1

B) Classified Up on The Distance From The Donor To The Recipient Site into :

1- *Local Flaps* : Both recipient and donor sites lies close to each other ,, Ex : Rhomboid Flap .

2- *Distant Flaps* : Both The recipient and the donor sites are far from each other and are farther subclassified into :

- *Pedicled Flaps* : Ex. Pectoralis Major Flap For oral reconstruction .
- *Free Flaps* : The pedicle of the flap is divided and reanastomosed to another one in the recipient site ,, Ex: Radial Foremen flap for oral reconstruction .

C) Classified According To The Component Tissue Of the Flaps Into :

- *Cutaneous Flaps* (Only Skin)
- *Fasciocutaneous Flaps* (skin and subcutaneous tissue)
- *Fascioosseocutaneous Flaps*
- *Muscle Flaps*
- *Myocutaneous Flaps*
- *Fasciomyocutaneous Flaps*
- *Mucosal Flaps*
- *Myomucosal Flaps*